* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] In order to attain such a purpose, the failure restoration technique of the system concerning the claim 1 of this invention The 1st auxiliary memory in which the operating system was installed, The 2nd auxiliary memory which can read the information memorized from the removable secondary memory medium usable as a drive for activation and, In the failure restoration technique of the system equipped with the 3rd auxiliary memory [large capacity / auxiliary memory / 1st / above-mentioned] (a) while the above-mentioned operating system is functioning, beforehand the information by which the storage hold is carried out to the 1st above-mentioned auxiliary memory It backs up to the 3rd above-mentioned auxiliary memory every above-mentioned operating system. (b) When the above-mentioned operating system stops functioning, while the above-mentioned secondary memory medium is made to start a system using the program which carried out the storage hold beforehand The information which backed up to the 3rd above-mentioned auxiliary memory is restored to the 1st above-mentioned auxiliary memory.
[0015] Moreover, in a claim 1, the 1st aforementioned auxiliary memory of the failure restoration technique of the system concerning the claim 2 of this invention is a hard disk drive unit.
[0016] Moreover, in a claim 1, the 2nd aforementioned auxiliary memory of the failure restoration technique of the system concerning the claim 3 of this invention is a floppy disk drive, and the aforementioned secondary memory medium is a floppy disk.
[0017] Moreover, in a claim 1, the 3rd aforementioned auxiliary memory of the failure restoration technique of the system concerning the claim 4 of this invention is a magnetic tape unit.
[0018] Moreover, the storage which memorized the program for failure restoration of the system concerning the claim 5 of this invention The 1st auxiliary memory in which the operating system was installed, The 2nd auxiliary memory which can read the information memorized from the removable secondary memory medium usable as a drive for activation and, In the storage which memorized the program for failure restoration of the system equipped with the 3rd auxiliary memory [large capacity / auxiliary memory / 1st / above-mentioned] (a) The program which backs up beforehand the information by which the storage hold is carried out every above-mentioned operating system to the 1st above-mentioned auxiliary memory at the 3rd above-mentioned auxiliary memory while the above-mentioned operating system is functioning, (b) When the above-mentioned operating system stops functioning, while a system is started instead of the above-mentioned operating system It has the program which restores the information which backed up to the 3rd above-mentioned auxiliary memory to the 1st above-mentioned auxiliary memory.
[0019] Moreover, in a claim 5, the 1st aforementioned auxiliary memory of the storage which memorized the program for failure restoration of the system concerning a claim 6 is a hard disk drive unit.
[0020] Moreover, in a claim 5, the 2nd aforementioned auxiliary memory of the storage which memorized the program for failure restoration of the system concerning a claim 7 is a floppy disk drive, and the aforementioned secondary memory medium is a floppy disk.
[0021] Moreover, in a claim 5, the 3rd aforementioned auxiliary memory of the storage which memorized the program for failure restoration of the system concerning a claim 8 is a magnetic tape unit.
[0022] Moreover, the storage which memorized the program for failure restoration of the system concerning a claim 9 is making the secondary memory medium different, respectively carry out the storage hold of the program for carrying out the aforementioned backup, and the program for carrying out the aforementioned restoration in a claim 5.
[0023] moreover, the storage hold of the aforementioned restoration program is carried out in the program for the storage which memorized the program for failure restoration of the system concerning a claim 10 separating the program for starting the aforementioned system from the aforementioned restoration program in a claim 9, and

starting this system -- things -- the secondary memory medium is made to carry out a storage hold
[0024] Thus, restoration can be started, without installing OS on a hard disk drive unit, in order that the failure restoration technique of the system of this invention may perform activation and restoration of a system by constituting using the program in a removable secondary memory medium. Therefore, a system can be restored in simple and a short time.
[0025] Similarly, the storage which memorized the program for failure restoration of the system of this invention can start restoration, without installing OS on a hard disk drive unit, in order to perform activation and restoration of a system using the program in a removable secondary memory medium. Therefore, a system can be restored in simple and a short time.
[0026]
[Embodiments of the Invention] Next, the gestalt of one operation of this invention is explained with reference to drawing. In addition, since the computer system used with the gestalt of this operation is the same as that of the above-mentioned conventional technique, refer to the drawing 15 for it suitably.
[0027] Drawing 1 is a block diagram showing the gestalt of one operation of this invention. As shown in this drawing, the storage hold of backup-program 100a and the restoration program 100b is carried out at the floppy disk 100.
[0028] Backup-program 100a backs up by carrying out the storage hold of the information memorized by the hard disk drive unit 6 every OS at a magnetic tape. Restoration program 100b restores the information (henceforth backup data) which backed up beforehand to secondary memory mediums, such as a magnetic tape, to a hard disk drive unit 6, and performs restoration of a system or data.
[0029] Moreover, both [these] programs are constituted independently, respectively and can perform one of programs arbitrarily by operation of an operator. That is, either backup or restoration can be carried out arbitrarily. Therefore, you may make a respectively separate floppy disk carry out a storage hold.
[0030] Of course, about backup-program 100a, predetermined [every month] time may be performed automatically, or you may improve a program so that a predetermined [every week] day of the week may be performed automatically. Moreover, backup-program 100a is copied on a hard disk drive unit 6 from a floppy disk 100 in that case, and there is the need for making it reside in main memory 1d or expanded memory 1e permanently etc.
[0031] Next, a backup program is explained. Drawing 2 is a flow chart which shows an operation of a backup program. As shown in this drawing, a backup program consists of steps 1-5, and each step realizes a boot check function, a tape-check function, a tape lead function, I/O function, and a backup processing facility. Moreover, this backup program is read to main memory 1d or expanded memory 1e by CPU1a, and is performed by CPU1a.
[0032] That is, in step 1, it checks that the hard disk drive unit 6 which becomes a backing up agency is an activation drive, and the address of this activation drive is stored in expanded memory 1e (boot check function).
[0033] Subsequently, in step 2, it checks whether the magnetic tape unit 3 is connected (tape-check function). Subsequently, in step 3, it checks whether authentication of whether the magnetic tape unit 3 is equipped with the magnetic tape and its magnetic tape are formatted (tape lead function).
[0034] Subsequently, in step 4, various kinds of displays are performed on a display 4, and selection and the input of an active parameter are demanded from an operator (I/O function). Finally, backup processing is started in step 5 (backup processing facility).
[0035] Here, it states still in detail about each above-mentioned step. Drawing 3 is the flow chart which indicated steps 1 and 2 of drawing 2 in detail. First, in step 101, a backup program recognizes the system information of an activation drive.
[0036] Subsequently, in step 102, the address of activation ******** which becomes a backing up agency is saved to expanded memory 1e from the system information acquired at step 101.
[0037] Subsequently, in step 201, in order to check whether the magnetic tape unit 3 is connected to the computer 1, a product code is read from the firmware currently installed in the magnetic tape unit 3.
[0038] With this product code, the manufacturer of a magnetic tape unit 3, the specification of a product name and an usable magnetic tape, etc. are encoded. Therefore, the specification of an usable magnetic tape etc. can be known by reading this product code. It can judge whether the magnetic tape unit 3 is connected to the computer 1 especially by the ability of the product code to have been read here.
[0039] Subsequently, in step 202, if a product code can be read, it can be judged as that to which the magnetic tape unit 3 is connected, and will shift to step 301 of drawing 4 . On the other hand, when judged as that to which the magnetic tape unit 3 is not connected, it carries out displaying the purport on a display 4 etc., and connection of a

magnetic tape unit 3 is demanded from an operator.
[0040] Drawing 4 is the flow chart which indicated step 3 of drawing 2 in detail. First, the status of a magnetic tape unit 3 is checked in step 301. That is, it checks whether the magnetic tape unit 3 is equipped with the magnetic tape.
[0041] Subsequently, in step 302, if equipped with the magnetic tape, it will shift to step 304. On the other hand, if not equipped with the magnetic tape, it will shift to step 303, it will carry out displaying the purport on a display 4 etc., and insertion of a magnetic tape will be demanded from an operator.
[0042] Subsequently, in step 304, already, since a magnetic tape unit 3 is a ready state, it reads the volume information in which the magnetic tape is written by the head of a magnetic tape from end ********** (step 305), and stores this volume information in expanded memory 1e (step 306).
[0043] Subsequently, in step 307, it judges whether a magnetic tape is format ending from the read volume information. That is, if it is a magnetic tape [finishing / a format], and the volume information is written in and it is not formatted, no volume informations are written in.
[0044] Then, if the volume information is not written in, a format is judged to be what is not yet carried out, displays the purport on a display 4, and urges it to an operator that a magnetic tape is formatted manually.
[0045] Drawing 5 is the flow chart indicated in the detail of step 4 of drawing 2 . In step 401, the purport which checks whether a backup is started or not is displayed on a display 4. The operator who looked at this display keys using a keyboard 5 (step 402).
[0046] Subsequently, in step 403, as a result of this key input, if a backup is started, it will shift to step 405, and if a backup is stopped, it will shift to step 404 and end processing of a backup will be performed.
[0047] Subsequently, in step 405, the number the partition in the hard disk drive unit 6 connected to the computer 1 and the hard disk drive unit 6 was numbered is displayed on a display 4. For example, in Windows 95, either of 26 kinds to A-Z is attached.
[0048] And the operator who looked at this display keys using a keyboard 5 (step 406), if a hard disk drive unit to back up etc. is chosen as a result of this key input, when it shifts to step 408 and it is not chosen, he will return to step 401, and he checks again whether a backup is started or not to an operator (step 407).
[0049] Subsequently, in step 408, the specification of an usable magnetic tape is displayed on a display 4 based on the product code read at step 201. The operator who looked at this display checks whether it is specification to use the displayed specification, keys using a keyboard 5, and shifts to step 411. On the other hand, when it is not specification to use, it returns to step 405 by key input.
[0050] Subsequently, in step 411, in order to perform the last authentication of backup start, the purport to check is displayed on a display 4. The operator who looked at this display keys using a keyboard 5 (step 412). Subsequently, in step 413, if a backup is started, it shifts to step 501 of drawing 6 , and when the last authentication is refused, it will return to step 408.
[0051] Drawing 6 is the flow chart which indicated the detail of step 5 of drawing 2 . First, in step 501, a magnetic tape is written out and it rewinds at the head of a position. And the volume information currently written in beforehand is positioned in a skip (step 502), and the magnetic head is positioned in the head fraction of a data area.
[0052] Subsequently, in step 503, if a lead error did not occur when [this] reading an information from a hard disk drive unit 6 in a file unit, when it shifts to step 507 and a lead error occurs, it shifts to step 505.
[0053] Subsequently, in step 507, since a lead error did not occur, after opening a file in false on main memory 1d or expanded memory 1e (step 507), carrying out creating a file header to this opened file etc., editing file information and combining a file header and real data further, a file is closed (step 508), and it writes in a magnetic tape (step 509).
[0054] Subsequently, in step 510, the above-mentioned step is repeated until it returns to step 503 and it backs up all the files in a hard disk drive unit 6, if a light error does not occur. When a light error occurs, after shifting to step 511 and performing light error processing, it shifts to step 512.
[0055] On the other hand, when a file is read and a lead error occurs in step 505, it judges whether a file is "EOF (End Of File)." Consequently, if it is "EOF", it will shift to step 512. Moreover, if it is not "EOF", it is judged as a lead error, and it will shift to step 506, lead error processing will be performed, it will return to step 503 further, and the following file will be read from a hard disk drive unit 6.
[0056] Subsequently, in step 512, since the backup of all the files of a hard disk drive unit 6 was completed, backup processing is ended. All the informations containing OS in a hard disk drive unit 6 can be backed up to a magnetic tape the above result.
[0057] Next, the procedure of the operation which restores backup data to a hard disk drive unit, i.e., restoration, is explained. Drawing 7 is a flow chart which shows an operation of a restoration program. As shown in this drawing,

a restoration program consists of steps 6-11, and each step realizes a system startup function, a magnetic-tape-unit detection function, a magnetic-tape-volume check function, a hard-disk detection function, I/O function, and a restoration-processing function. Moreover, this restoration program is read to main memory 1d or expanded memory 1e by CPU1a, and is performed by CPU1a.

[0058] That is, in step 1, in order to format the hard disk drive unit 6 of a restoration place, a system is started from floppy disk 1c (system startup function).

[0059] Subsequently, in step 2, it checks whether the magnetic tape unit 3 is connected (magnetic-tape-unit detection function). Subsequently, in step 3, it checks whether it is that the data by which the storage hold is carried out were written to be by the predetermined backup program in the magnetic tape (magnetic-tape-volume check function).

[0060] Subsequently, the address of the hard disk drive unit 6 used as a restoration place is detected (hard-disk detection function). Subsequently, selection and the input of the parameter by the operator are urged (I/O function). Subsequently, execution of restoration processing is started (restoration-processing function).

[0061] Drawing 8 is the flow chart which indicated step 6 of drawing 7 in detail. First, in step 601, floppy-disk-drive 1b is equipped with floppy disk 1c simultaneously with powering on of a computer 1.

[0062] Then, this floppy-disk-drive 1b is usable as an activation drive, and when equipped with floppy disk 1c, the content of this floppy disk 1c is read to main memory 1d etc. ahead of a hard disk drive unit 6.

[0063] Consequently, a system is started by work of the activation means within a restoration program. Subsequently, in step 602, the hard disk drive unit 6 used as a restoration place is formatted. Subsequently, in step 603, a restoration program is performed by operation of the input of the command by the operator etc.

[0064] Drawing 9 is the flow chart which indicated step 7 of drawing 7 in detail. Here, a maximum of six SCSI devices, such as a magnetic tape unit and a hard disk drive unit, shall be connectable with the SCSI board 2. Therefore, it investigates whether the magnetic tape unit 3 is connected by reading a product code in SCSI device connected to the computer 1. Then, the variable "CNT" for counting the number of SCSI device is set up, and "0" is stored in "CNT" as initial value (step 701).

[0065] Subsequently, a product code is read in each of SCSI device connected to the computer 1 in step 702. That is, a product code is read from the firmware currently installed in each SCSI device, and it judges whether the magnetic tape unit 3 is connected to the computer 1 by analyzing a product code. And if a magnetic tape unit 3 is discovered, it shifts to step 707, and if not discovered, it will shift to step 704.

[0066] Subsequently, in step 704,705, "1" is added to "CNT", and steps 702-704 are repeated until this "CNT" exceeds "6." However, when judged with finally the magnetic tape unit 3 not being connected, in order to demand connection of a magnetic tape unit 3 from an operator in step 706, the purport is displayed on a display 4.

[0067] On the other hand, after detecting that the magnetic tape unit 3 is connected in step 707, the status of a magnetic tape unit 3 is checked. That is, it checks whether the magnetic tape unit 3 is equipped with the magnetic tape. If a magnetic tape is insertion ending, it shifts to step 801 of drawing 10 , and if not equipped, it will shift to step 709 and the purport will be displayed on a display 4 to an operator (step 708,709).

[0068] Drawing 10 is the flow chart which indicated step 8 of drawing 7 in detail. In order to search the volume information on a magnetic tape in step 801, it is end volume **** about a magnetic tape. And a volume information is read (step 802).

[0069] Subsequently, in step 803, this magnetic tape checks whether it is the tape which carried out the storage hold of the backup data by analyzing the volume information on a magnetic tape. And it is displayed that it will shift to step 805 if it is the tape which carried out the storage hold of the backup data, otherwise, it shifts step 804, and the purport exchanges for the right magnetic tape on a display 4. Subsequently, the volume information which read the point is stored in expanded memory 1e in step 805.

[0070] Drawing 11 is the flow chart which indicated step 9 of drawing 7 in detail. Here, the drive which can start a system is detected. That is, the drive address and the number of the hard disk drive unit on a system and a floppy disk drive are detected. Then, the variable "CNT" for carrying out counting of the number of the hard disk drive unit 6 connected to the system and the variable "FDCNT" for counting the number of floppy-disk-drive 1b are set up.

[0071] First, initial value "0" is stored in "CNT" and "FDCNT" in step 901. On the other hand, in order to check what the address of a hard disk drive unit 6 and floppy-disk-drive 1b has become, respectively, the file in floppy disk 1c "IO.SYS" is read, and an execution result is stored in a variable "DRV_latest starting time."

[0072] When a value is "7 xh", in order to mean detecting a floppy disk drive at this time, into "DRV_latest starting time", the address of the floppy disk drive by which the storage hold is carried out is stored in a variable "DRV_ADRS", and "+1" of the pointer of "DRV_latest starting time" is carried out. Furthermore, since it means

detecting one floppy disk drive, "+1" of the variable "FDC_CNT" is carried out (steps 905,909-911).
[0073] When the checked value is "9 xh", it means, detecting a hard disk drive unit in step 906 on the other hand, and similarly, into "DRV_latest starting time", the address by which the storage hold is carried out is stored in "DRV_ADRS" (step 907), and "+1" of the pointer of "DRV_latest starting time" is carried out (step 908).
[0074] Processing of these steps 903-913 is made into one loop, and is repeated address A which can assign a system, - Z parts (26 loops). Therefore, if 1 loop end is carried out, after carrying out "+1" to "CNT", the value of "CNT" judges whether it is equal to "26", and shifts to the ****** step 903 equally. When equal, it shifts to step 1001 of drawing 10 .
[0075] Drawing 12 is the flow chart which indicated step 10 of drawing 7 in detail. In step 1001, in order to check whether restoration is started, the purport is displayed on a display 4. If the operator who looked at this keys using a keyboard 5 (step 1002) and restoration is started, it shifts to step 1005, and if it does not start, he will shift to step 1004 and will carry out end processing of restoration (step 1003).
[0076] Subsequently, in step 1005, in order to carry out the last authentication of whether restoration is started or not, the purport is displayed on a display 4. If restoration is started, it keys using a keyboard 5 (step 1006), it shifts to step 1101 of drawing 13 , and the operator who looked at this will return to step 1001, if it does not start (step 1007).
[0077] Drawing 13 is the flow chart which indicated step 11 of drawing 7 in detail. In step 1101, the magnetic tape with which the magnetic tape unit 3 detected at step 7 is equipped is rewound at the head of a beginning position, and the volume information currently written in beforehand is skipped (step 1102). And the magnetic head is positioned in the head fraction of a data area.
[0078] Next, data are read from a magnetic tape in a block unit. If a lead error did not occur, when it shifts to step 1107 and it generates, it shifts to step 1105.
[0079] Subsequently, in step 1105, it judges whether the read file is "EOF", and if it is "EOF", it will shift to step 1112. If it is not "EOF", it shifts to step 1106, and lead error processing will be performed and it will shift to step 1112 after that.
[0080] On the other hand, in step 1107, when it reads from a magnetic tape correctly and it puts, on expanded memory 1e, the false opening of the file is carried out and this lead data is divided at the file information section and data division. And after editing this file header and data of a file that were made to open, a file closing is carried out (step 1108), and it writes in a hard disk drive unit 6 (step 1109).
[0081] Subsequently, in step 1110, when a light error does not occur, it returns to step 1101, and the above-mentioned step is repeated until all the files in a magnetic tape are restored by the hard disk drive unit 6. On the other hand, when a light error occurs, after performing light error processing in step 1111, it returns to step 1101. Finally, restoration processing is ended in step 1112.
[0082] As explained above, this invention can restore the data which can back up the information on a hard disk drive unit 6 to a magnetic tape every round head, and were backed up to a hard disk drive unit 6.
[0083] Next, the gestalt of operation of the others of this invention is explained. Although this invention concerning drawing 1 is carrying out the storage hold of backup-program 100a and the restoration program 100b into the floppy disk 100 of one sheet, it may be difficult for the floppy day disk with a small capacity to carry out the storage hold of both the programs. Moreover, backup-program 100a needs to be used only when a hard disk drive unit 6 is normal, and a storage hold does not necessarily need to be carried out at a floppy disk.
[0084] Drawing 14 is a block diagram showing the gestalt of operation of the others of this invention. As shown in this drawing, the storage hold of system bootstrap 200a and the floppy disk exchange display-program 200b is carried out at the floppy disk 200. Moreover, the storage hold of the restoration program 300a is carried out at the floppy disk 300.
[0085] That is, in case a system is started, a floppy disk drive is equipped with a floppy disk 200 simultaneously with powering on of a computer, and a system is started by work of system bootstrap 200a. And after starting a system, the purport which exchanges floppy disks is displayed on a display 4 by work of floppy disk exchange display-program 200b.
[0086] Then, the operator who looked at this display takes out a floppy disk 200 from a drive, and equips a drive with a floppy disk 300 instead. Consequently, restoration processing is started by work of restoration program 300a. In addition, it may provide by the floppy disk different from the above, and as long as additional coverage is in capacity, you may make either of the floppy disks 200,300 carry out a storage hold about a backup program, in order not to use it in the case of restoration. Moreover, the function to start a system does not need to be included in restoration program 300a.

37] In addition, in the gestalt of the above-mentioned implementation, although the floppy disk was made to ry out the storage hold of the restoration program etc., as long as it can start a system, you may use other condary memory mediums. Moreover, it is clear that it is applicable not only to a backup of the information on a ard disk drive unit but a backup of the information on other storages. Moreover, as long as the capacity of a magnetic tape is larger than a hard disk drive unit with a natural thing, one magnetic tape can be made to carry out the storage hold of all the backup data, and the capacity of a magnetic tape may divide backup data into two or more magnetic tapes, and may make them carry out the storage hold of the time of the parvus conversely. Moreover, you may use storages, such as an optical disk or a magneto-optic disk, instead of a magnetic tape.

[Translation done.]